IN THE CLAIMS

1. (Original) A film thickness measuring apparatus using a fast Fourier transformation, comprising:

a light receiving unit which includes a light source, an optical fiber which focuses a light from the light source, outputs the light in a direction, receives the light reflected by a surface of a sample material of a substrate having a thin film and outputs the light in the other direction, and a lens which adjusts the magnification of a light from the optical fiber and light reflected by the surface of the sample material;

a detection unit which includes a spectrograph which splits a reflection light which is reflected by the surface of the sample material and is inputted into the optical fiber through the lens and is outputted in the other direction, based on an optical intensity (spectrum) of each wavelength, and an optical measuring device array which provides a certain light intensity of each wavelength;

a transformation unit which transforms a wavelength based spectrum detected by the detection unit into an analog signal and transforms the analog signal into a digital signal by the transformation unit;

a computation unit which computes the number of vibrations based on a fast Fourier transformation in which the data transformed by the transformation unit adapts a refraction index dispersion; and

an analyzing unit which measures and analyzes a film thickness based on the number of vibrations computed by the computation unit, and a result of the same is

displayed.

2. (Original) The apparatus of claim 1, wherein said computation unit adapted to compute the number of vibrations based on a fast Fourier transformation adapting the refraction index dispersion is directed to measuring a film thickness based on the number of the vibrations obtained based on the fast Fourier transformation with respect to reflection spectrum on an energy axis in which the refraction index weight is multiplied.

3. (Currently Amended) The apparatus of ~~either~~ claim 1 ~~or claim 2~~, wherein said computation unit is directed to implementing a fast Fourier transformation based on the following Equations:

$$OPD = 2n_f d$$

$$n_f d = \frac{\lambda(\lambda + \Delta\lambda)}{2\Delta\lambda} \approx \frac{\lambda^2}{2\Delta\lambda}$$

$$= \frac{619.9}{\Delta E}$$

where OPD represents an optical path difference between the reflection plates when the light is reflected by one time therebetween, d represents a thickness of a thin film, n_f represents a refraction index of a thin film, λ represents a wavelength of light, Δλ represents a wavelength difference between two light waveforms of a vibration period by an interference, and ΔE represents a difference of an energy

between two light waveforms.

4. (Original) The apparatus of claim 1, wherein said computation unit is directed to computing a thickness of a thin film based on the following Equations:

$$n_f d = 619.9x\ f_E$$

$$d = \frac{619.9}{\Delta(n_f E)} = 619.9xf_{nE}$$

where f_E represents the number of the vibrations on the energy axis, d represents a thickness of a thin film, n_f represents a refraction index of a thin film, and ΔE represents a difference of an energy between two optical waves, and f_{nE} represents the number of vibrations which is obtained based on a fast Fourier transformation with respect to a reflection spectrum on an energy axis in which a refraction index weight is multiplied.

5. (Original) In a method for measuring a thickness of a thin film based on an interference effect by a thin film, a method for measurement of film thickness using an improved fast Fourier transformation, comprising the steps of:

a step in which a light from a light source is focused on a substrate having a grown thin film, and the light is inputted onto an end of an optical fiber;

a step in which the light from an end of the optical fiber is vertically inputted

onto a surface of a sample material having a thin film;

a step in which the light vertically inputted onto a surface of the sample material having a thin film is reflected and inputted into the optical fiber through a lens;

a step in which a wavelength based spectrum data is transformed into an analog signal by a detection unit which splits the outputted light into a spectrum of each wavelength, and the analog signal is transformed into a digital signal;

a step in which a film thickness is computed based on a vibration period obtained based on a fast Fourier transformation by adapting a refraction index dispersion through the transformed signal; and

a step in which a thickness of a film is analyzed by the computed film thickness, and the analyzed result is displayed.

6. (Original) The method of claim 5, wherein in said step for computing a film thickness based on a vibration period obtained through a fast Fourier transformation by adapting a refraction index dispersion, a film thickness is measured by the number of vibrations obtained by transforming a reflection spectrum using a fast Fourier transformation method on an energy axis in which a refraction index weight is multiplied based on Equation of:

$$d = \frac{619.9}{\Delta(n_f E)} = 619.9 x f_{nE}.$$

7. (New) The apparatus of claim 2, wherein said computation unit is directed to implementing a fast Fourier transformation based on the following Equations:

$$OPD = 2n_f d$$

$$n_f d = \frac{\lambda(\lambda + \Delta\lambda)}{2\Delta\lambda} \approx \frac{\lambda^2}{2\Delta\lambda}$$

$$= \frac{619.9}{\Delta E}$$

where OPD represents an optical path difference between the reflection plates when the light is reflected by one time therebetween, d represents a thickness of a thin film, n_f represents a refraction index of a thin film, λ represents a wavelength of light, $\Delta\lambda$ represents a wavelength difference between two light waveforms of a vibration period by an interference, and ΔE represents a difference of an energy between two light waveforms.